4. (Once Amended) The wavelength stabilized laser module according to claim 1, wherein a degree of parallelization of said single beam [parallel luminous flux] is within ± 2°.

19. (Once Amended) The wavelength stabilized laser module according to claim 1, further comprising an optical fiber used as a device through which laser light is output and a single case housing, at least, said semiconductor laser, said temperature calibrating unit, said converting unit for said light conversion to said single beam [parallel luminous flux], said filter and said first photoelectric converting unit and said second photoelectric converting unit.

REMARKS

This paper is being provided in response to the August 22, 2002, Office Action for the above-referenced application. In this response, Applicants have amended claims 1, 3, 4 and 19 to clarify that which Applicants deem to be the claimed invention. Applicants respectfully submit that the modifications to the claims are all supported by the originally filed application.

The rejection of claims 1-3, 5-7, 9, 13-15, and 17 under 35 U.S.C. §102(e) as anticipated by Stayt, Jr. *et al.*(U.S. Patent No. 6,389,046) is hereby traversed and reconsideration thereof is respectfully requested in view of amendments to the claims contained herein.

Independent claim 1, as amended herein, recites a wavelength stabilized laser module comprising a semiconductor laser, a temperature calibrating unit to calibrate a temperature of the laser, a converting unit to convert light emitted from said

semiconductor laser to a single beam of parallel luminous flux, a first photoelectric converting unit to receive a first part of the beam and to convert it to an electric signal, a filter to receive a second part of the beam and to continuously change its transmittance depending on wavelengths of the beam, a second photoelectric converting unit to receive light transmitted through the filter and to convert it to an electric signal, wherein a control signal, to be used for stabilization, obtained by computations of the electric signals is fed back to the laser and/or the temperature calibrating unit so that the laser is able to stably emit laser light having a reference wavelength to be used as a target for stabilization of wavelengths. Claims 2 through 19 depend from claim 1.

The cited art of Stayt discloses methods using a dedicated control laser element 150 in an array 110 of semiconductor lasers for sensing and stabilizing the laser array power and wavelength and reducing drift in a wavelength stabilized laser source (Column 1, lines 12-15). The system described therein includes a discriminator 301, which may be an interferometer or a high-pass, low-pass, band-pass or interference filter, which generates a pair of optical beams of equal wavelength (Column 7, lines 16-20) from the output of the control laser element 150. Each one of a pair of photodetectors 441 detects one of the two emergent optical beams from the discriminator 301 and generates an electrical signal 451, 551 (Column 7, lines 27-29). The electrical output signals are amplified and then input into a closed feedback loop 700, which evaluates differences in the electrical signals and produces a control signal 720. The control signal 720 is communicated to a temperature controller that adjusts the control laser element 150 (and,

thus the array 110) to produce output 160 at the desired wavelength (Column 6, lines 20-34).

Applicant respectfully submits that Stayt does not show, teach or suggest the features as recited in independent claim 1 of, "*...a converting unit to convert light emitted from said semiconductor laser to a single beam of parallel luminous flux; a first photoelectric converting unit to receive a first part of said beam and to convert it to an electric signal; a filter to receive a second part of said beam and to continuously change its transmittance depending on wavelengths of said beam;...*"

Stayt, as described above, receives the laser output 160 from a dedicated laser element 150 at discriminator 300/301, which generates a pair of optical beams 400, 500 that are each optionally, but preferably, directed into one of a pair of collimating lenses 410, 510 (Column 6, lines 1-5) and then a pair of adjustable turning mirrors 430, 530. Applicant respectfully points out that discriminator 300/301, being an interferometer or filter, does not convert the incident light to a single beam of parallel luminous flux as recited in claim 1. The pair of adjustable turning mirrors 430, 530 suggested by Stayt introduces even more components. This is in contrast to the Applicant's claimed invention, which employs a converting unit that emits a single beam, portions of which may be detected by two photoelectric converting units resulting in a reduction of optical component count (as illustrated in Figures 1 and 9-13, and described on page 14, lines 5-27 of the Applicant's specification).

Based on the above, Applicant respectfully requests that this rejection be withdrawn.

The rejection of claims 1-3, 5-7, 9, 11-15, and 17 under 35 U.S.C. §102(e) as anticipated by Broutin *et al.*(U.S. Patent No. 6,301,280) is hereby traversed and reconsideration thereof is respectfully requested in view of amendments to the claims contained herein.

Claim 1 is summarized above. Claims 2-19 depend from claim 1.

The cited art of Broutin discloses a wavelength stabilized laser system 100 that includes a laser 110 that produces a laser light 111*b*. A focusing lens 160 focuses the laser light 111b onto a beam splitter 170, which deflects a portion of the laser light onto a first detector PD1 that provides a first signal S1 representing the amplitude of the laser light 111b. (Column 2, line 64, through Column 3, line 5) The laser light that is not deflected is transmitted through beam splitter 170 and filter 190 to a second detector PD2, which produces a second signal S2. (Column 3, lines 6-10) Circuitry 200 includes a transformer 210 that generates in its second coil 214 a voltage difference signal VD that is proportional to the difference between signals S1 or S2. Controller 120 uses the difference voltage VD to determine the magnitude and direction of deviation of the wavelength of laser 110, in order that the temperature of the laser may be adjusted accordingly. (Column 3, lines 50-54).

Applicant respectfully submits that Broutin does not show, teach or suggest the features as recited in independent claim 1 of, "*...a converting unit to convert light emitted from said semiconductor laser to a single beam of parallel luminous flux; a first photoelectric converting unit to receive a first part of said beam and to convert it to an electric signal; a filter to receive a second part of said beam and to continuously change its transmittance depending on wavelengths of said beam;...*"

As described above, Broutin teaches the use of a focusing lens 160 to focus the laser light 111b onto a beam splitter 170, which then deflects and transmits two beams of light whose respective luminous fluxes are no longer parallel (see Figure 1 and Column 2, line 64 through Column 3, line15). A configuration of components similar to that described in Broutin is shown in Figure 26 of the present application and described in the "Description of Related Art" section (Page 9, line 26 thru Page 10, line 9). Broutin-like configurations are known to the Applicant, and require complicated placement and arrangement of components, causing an increase in manufacturing costs. Moreover, none of these Broutin-like configurations convert light emitted from a semiconductor laser to a single beam of parallel luminous flux, as recited in the presently claimed invention.

Accordingly, based on the above, Applicant respectfully requests that this rejection be withdrawn.

The rejection of claim 4 under 35 U.S.C. §103(a) as being unpatentable over Stayt or Broutin is hereby traversed and reconsideration thereof is respectfully requested.

Claim 4 depends from claim 1, which has been shown above to be patentably distinct over both Stayt and Broutin. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

The rejection of claims 8 and 10 under 35 U.S.C. §103(a) as being unpatentable over Stayt or Broutin in further view of Alphonse (U.S. Patent No. 6,018,536) is hereby traversed and reconsideration thereof is respectfully requested.

Claims 8 and 10 depend from claim 1, discussed above.

The cited art of Stayt and Broutin are discussed above.

The cited art of Alphonse discloses a laser that produces light having multiple wavelengths. The laser includes a gain medium disposed within the laser resonance cavity, a dispersion element coupled to the gain medium and within the laser resonance cavity, and a wavelengths-elective element having non-abutting reflective segments.

Applicant respectfully submits that Alphonse does not teach or suggest *a converting unit to convert light emitted from said semiconductor laser to a single beam of parallel luminous flux*, as recited in claim 1, from which claims 8 and 10 depend. Accordingly, the deficiencies of claim 1 with respect to Stayt or Broutin, discussed above, are not overcome by the addition of the Alphonse reference. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

The rejection of claim 16 under 35 U.S.C. §103(a) as being unpatentable over Stayt or Broutin in further view of Chang-Hasnain *et al.* (U.S. Patent No. 6,233,263) is hereby traversed and reconsideration thereof is respectfully requested in view of amendments to the claims contained herein.

Claim 16 depends from claim 1, discussed above.

Stayt and Broutin are discussed above.

Chang-Hasnain discloses a monitoring and control assembly for an optical system that includes a tunable laser. The laser is disclosed as generating a divergent output beam along an optical axis.

Chang-Hasnain similarly fails to supply the recited elements of *a converting unit to convert light emitted from said semiconductor laser to a single beam of parallel luminous flux*, as recited in claim 1, from which claim 16 depends. Thus, the deficiencies of both the Stayt and Broutin references with respect to claim 1, discussed above, are not overcome by the addition of the Chang-Hasnain reference. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

The rejection of claims 18 and 19 under 35 U.S.C. §103(a) as being unpatentable over Stayt or Broutin in further view of Ohtsuka *et al.*(U.S. Patent No. 5,446,750)is hereby traversed and reconsideration thereof is respectfully requested.

Claims 18 and 19 depend from claim 1, discussed above.

Stayt and Broutin are discussed above.

Ohtsuka discloses a laser diode pumped solid laser having an optical module with a laser diode, a solid laser crystal, which is excited by a beam generated by the laser diode, and a resonator. An electronic cooling device has a cooling surface, on which the optical module is placed, and a heat radiating surface.

Ohtsuka also fails to supply the recited elements of *a converting unit to convert light emitted from said semiconductor laser to a single beam of parallel luminous flux*, as recited in claim 1, from which claims 18 and 19 depend. Thus, the deficiencies of both Stayt and Broutin, discussed above with respect to claim 1, are not overcome by the addition of the Ohtsuka referece. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

Based on the above, Applicants respectfully request that the Examiner reconsider and withdraw all outstanding rejections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

Respectfully submitted,
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Date

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